REMARKS

In the above-referenced Office Action, claims 33, 35 and 40-47 were rejected under 35 U.S.C. §112, second paragraph; claims 1-7, 17-23, 32-33, 35, 40-46, 48-51, 55 and 57-58 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,334,065 (hereinafter Al-Ali); claims 1, 9-12, 17 and 24-31 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,987,351 (hereinafter Chance) in view of Al-Ali; claim 47 was rejected under 35 U.S.C. §103(a) as being obvious over Al-Ali; and claims 52-54, 56 and 59-62 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Al-Ali in further view of U.S. Patent No. 5,853,370 (hereinafter Chance et al.).

With this amendment, claims 1-7, 10-12, 17-24, 26-33, 35, 40 and 42-62 remain present in this application. Applicants wish to apologize to the Examiner for the late entry, into the Specification, of the claim of the benefit of the filing date of U.S. Provisional Application Serial No. 60/103,985, which has a priority date of October 13, 1998. However, Applicants note that International Application No. PCT/US99/22940, which was filed on October 13, 1999, claimed priority to U.S. Provisional Application Serial No. 60/103,985 and the notification of the acceptance of the present application under 35 U.S.C. §371 specifically showed the priority date of October 13, 1998. Additionally, Applicants note that the time periods set forth in 37 C.F.R. §1.78 are not applicable to this application as this application is a non-provisional application, which entered the national stage after compliance with 35 U.S.C. §371 from an international application filed under 35 U.S.C. §363 before November 29, 2000 (see 37 C.F.R. §1.78(5)(ii)(B)). Thus, Al-Ali, which has a filing date of May 27, 1999, is not a proper reference under 35 U.S.C. §§ 102(e) and 103(a).

Applicants have revised claims 1-5, 7, 10, 11, 17-24, 26-31, 33, 35, 40, 42, 44, 48-54 and 56-62 in response to the 35 U.S.C. §112, second paragraph, rejections and the Examiner's request that Applicants thoroughly review the claims and correct any similar errors. As such, Applicants submit the 35 U.S.C. §112, second paragraph, rejections are now moot.

Applicants respectfully submit that the rejection of claims 1-7, 17-23, 32-33, 35, 40, 42-46, 48-51, 55 and 57-58 under 35 U.S.C. §102(e) as being anticipated by Al-Ali are now

moot due to the fact that claim 41 has been cancelled and Al-Ali is not available as a prior art reference.

With respect to the rejection of claims 1, 9-12, 17 and 24-31 under 35 U.S.C. §103(a) as being unpatentable over Chance in view of Al-Ali, Applicants respectfully submit that these rejections are now moot as claims 9 and 25 have been cancelled and Al-Ali is not available as a prior art reference.

With respect to the rejection of claim 47 under 35 U.S.C. §103(a) as being obvious over Al-Ali, Applicants respectfully submit that this rejection is now moot as Al-Ali is not available as a prior art reference.

With respect to the rejection of claims 52-54, 56 and 59-62 under 35 U.S.C. §103(a) as being unpatentable over Al-Ali and in further view of Chance et al., Applicants respectfully submit that Al-Ali is not available as a prior art reference and, as such, these rejections are now also moot.

Applicants again wish to apologize to the Examiner for the late addition to the Specification of the benefit claim to U.S. Provisional Application Serial No. 60/103,985. However, as noted above, claiming benefit of the earlier filed application is permissible under 37 C.F.R. §1.78.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The first page of the marked-up version is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE," with added text underlined and deleted text in [brackets].

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CONCLUSION

For all the foregoing reasons, Applicants respectfully submit that claims 1-7, 10-12, 17-24, 26-33, 35, 40 and 42-62 are now allowable. If the Examiner has any questions or comments with respect to this amendment, the Examiner is invited to contact the undersigned at 616/949-9610.

Respectfully submitted,

BRUCE J. BARRETT ET AL.

By: PRICE, HENEVELD, COOPER, DEWITT & LITTON

05-20-03
Date

Michael R. Long
Registration No. 42 808
695 Kenmoor SE
P.O. Box 2567
Grand Rapids, Michigan 49501-2567
616/949-9610

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-5, 7, 10-11, 17-24, 26-31, 33, 35, 40, 42, 44, 48-54 and 56-62 have been amended as follows:

1. (Twice Amended) A method for comparative spectrophotometric in vivo monitoring and display of selected blood metabolites present in a plurality of different internal regions of the same test subject on a continuing and substantially concurrent basis, comprising the steps of:

applying [a] separate spectrophotometric sensors to a test subject at each of a plurality of separate testing sites and coupling each [such] of said sensors to a control and processing station;

operating a selected number of said sensors on a substantially concurrent basis to spectrophotometrically irradiate at least two separate internal regions of the test subject during a common time interval, each [such] of said regions being associated with a different [such] of said testing sites;

separately detecting and receiving [the] light energy resulting from said spectrophotometric irradiation for each of said at least two [different] separate internal regions, and conveying separate sets of signals to said control and processing station which correspond to the separately detected light energy from said at least two [different] separate internal regions;

separately and concurrently analyzing said conveyed separate sets of signals to separately determine quantified data representative of [and evaluating the same selected] a blood metabolite in each of said at least two separate internal regions; and

concurrently visually displaying said separately determined quantified data for each of said at least two [different] separate internal regions for direct concurrent mutual comparison, wherein said sensors are applied to a head of the test subject and are used to monitor two mutually separate regions within a brain of the test subject.

2. (Twice Amended) The method of claim 1, wherein said step of analyzing comprises quantitative determination of blood oxygenation levels within each of said at least two separate internal regions.

3. (Amended) The method of claim 2, wherein said analyzing step includes producing [a] separate quantitative value determinations for hemoglobin oxygen saturation for each of said at least two [different] separate internal regions.

4. (Amended) The method of claim 3, wherein said analyzing [determination] step includes production of [an] ongoing graphical traces representing a plurality of said quantitative value [designations] determinations made at successive points in time.

5. (Amended) The method of claim 3, including the step of visually displaying a plurality of said quantitative value [designations] determinations at substantially the same time and in predetermined relationship to one another to facilitate rapid and accurate visual comparison.

7. (Amended) The method of claim 6, including the step of visually displaying a plurality of said quantitative value determinations [designations as well as said graphical traces] at substantially the same time and in predetermined relationship to one another to facilitate rapid and accurate visual comparison.

10. (Amended) The method of claim [9] 1, wherein said metabolite comprises hemoglobin oxygen.

11. (Twice Amended) The method of claim [9] 1, wherein said sensors are positioned in locations proximate to different brain hemispheres and said two mutually separate [internal] regions are [each] located in a different [such] brain hemisphere.

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17. (Twice Amended) An apparatus for concurrent comparative spectrophotometric in vivo monitoring of selected blood metabolites present in each of a plurality of different internal regions on a continuing basis, comprising:

a plurality of spectrophotometric sensors, each attachable to a test subject at [a] different test locations and adapted to separately but concurrently spectrophotometrically irradiate [a] at least two different internal regions within the test subject associated with each [such] of said test locations;

a controller [and processor,] and circuitry coupling each [such] of said sensors to said controller [and processor] for separately and individually but concurrently operating certain of said sensors to spectrophotometrically irradiate each of said different internal regions within the test subject associated with each [such] of said test locations;

said sensors each further adapted to receive light energy resulting from the separate spectrophotometric irradiation [by that sensor] of [its] said sensors associated one of said at least two different internal regions on a substantially concurrent basis with other [such] said sensors, and to produce separate signals corresponding to the light energy [so] received[; and], said circuitry acting to convey said separate signals to said controller [and processor] for separate analytic processing;

said controller [and processor] adapted to analytically process said conveyed signals separately and thereby determine separate quantified blood metabolite data therefrom for [separate such] each of said sensors and said sensors [different] associated one of said at least two different internal regions; and

a visual display coupled to said controller [and processor] and adapted to separately but concurrently display the quantified blood metabolite data [so] determined for each of [a plurality of] said sensors in a mutually-comparative manner, wherein said sensors are adapted to be applied to a head of the test subject and to monitor a brain of the test subject.

18. (Twice Amended) The apparatus of claim 17, wherein said controller [and processor] is adapted to analyze said data to quantitatively determine blood oxygenation within said at least two [separate] different internal regions.

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19. (Twice Amended) The apparatus of claim 18, wherein said controller [and processor] is adapted to produce separate numeric value designations for hemoglobin oxygen saturation for said at least two [of said] different internal regions.

20. (Amended) The apparatus of claim 19, wherein said controller [and processor] and said display are adapted to produce [an] ongoing graphical traces representing a plurality of said numeric value designations for the same region taken over a period of time.

21. (Amended) The apparatus of claim 19, wherein said controller [and processor] and said display are adapted to visually display at least two of said numeric value designations on a substantially concurrent basis and in predetermined relationship to one another to facilitate rapid and accurate visual comparison.

22. (Amended) The apparatus of claim 20, wherein said controller [and processor] and said display are adapted to visually display at least two of said graphical traces on a substantially concurrent basis and in predetermined relationship to one another to facilitate rapid and accurate visual comparison.

23. (Amended) The apparatus of claim 22, wherein said controller [and processor] and said display are adapted to visually display at least two of said numeric value designations as well as at least two of said graphical traces on a substantially concurrent basis and in proximity to one another to facilitate rapid and accurate visual comparison.

24. (Amended) The apparatus of claim 17, wherein said sensors are adapted to provide signals to said controller [and processor] which comprise at least two separate data sets that cooperatively define at least portions of a particular area within a given [such] one of said at least two different internal regions.

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26. (Amended) The apparatus of claim [25] 17, wherein said [computer] controller is adapted to determine blood oxygenation saturation in said brain.

27. (Twice Amended) The apparatus of claim [25] 17, wherein at least two of said sensors are adapted to be positioned in locations associated with mutually different hemispheres of the [same] brain and each [such] of said sensors is operable to separately monitor at least portions of each [such] of said different hemispheres.

28. (Twice Amended) The apparatus of claim 27, wherein said controller [and processor] is adapted to determine cerebral blood oxygenation saturation within each of said [two] different [brain] hemispheres.

29. (Twice Amended) The apparatus of claim 27, wherein said sensors are adapted to provide signals to said controller [and processor] which comprise at least two data sets that cooperatively define at least portions of a particular area within the same hemisphere of said brain.

30. (Twice Amended) The apparatus of claim 24, wherein said data sets provided by said sensors include [one such] a first set characterizing a first part of said particular [hemisphere] area and [another such] a second set characterizing a second part of said particular [hemisphere] area.

31. (Twice Amended) The apparatus of claim 30, wherein said second part of said particular [hemisphere] area characterized by said [other such data] second set includes at least part of said first part of said [hemisphere] area.

33. (Twice Amended) A method for concurrent comparative in vivo monitoring of blood metabolites in each of a plurality of different internal regions in a selected test subject, comprising the steps of:

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spectrophotometrically irradiating each of a plurality of different testing sites on said test subject;

detecting light energy resulting from said spectrophotometric irradiation [for a plurality of such] of said testing sites, and providing separate sets of signals to a control and processing station which are representative of the light energy [so] received [for] by each of said [plurality of] testing sites and which cooperatively define blood metabolite data for an individual one of [said defined] at least two different internal regions;

analyzing said [conveyed] separate signals to determine quantified blood metabolite data representative of at least one defined region within said at least one test subject associated with each of at least two different [such] of said testing sites, each [such] said defined region being different from the other; and

concurrently displaying [said] data sets for each of said at least two different internal regions at substantially the same time for direct mutual comparison, wherein said at least two different internal regions are located within different brain hemispheres of said test subject.

35. (Twice Amended) The method of claim 33, wherein said [provided] data sets include [one such] a first set which characterizes a first zone within one of said [defined] at least two different internal regions and [another such] a second set which characterizes a second zone that is at least partially within the same one of said [defined] at least two different internal regions.

40. (Twice Amended) The method of claim 33, wherein said spectrophotometric irradiation comprises application of at least two different wavelengths [and such wavelengths are] applied in an alternating sequence of timed pulses, and wherein detection of [the resulting] light energy corresponding to each of said at least two different wavelengths is done on a timed periodic basis using detection periods whose occurrence generally corresponds to that of said applied spectrophotometric [wavelength pulses] irradiation.

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42. (Twice Amended) The method of claim 40, wherein the duration of each of said [timed] detection periods is limited to a length which is less than that of each pulse of applied spectrophotometric irradiation[energy].

44. (Amended) The method of claim 43, wherein a plurality of said detection periods are used during pulses of said applied spectrophotometric irradiation, and a corresponding energy detection occurs during each of a plurality of said detection periods.

48. (Twice Amended) Apparatus for spectrophotometric in vivo monitoring of a selected metabolic condition in each of a plurality of different test subject regions on a substantially concurrent basis, comprising:

a plurality of spectrophotometric emitters, each adapted to separately spectrophotometrically irradiate a designated region within a test subject from a test location on [such] said test subject;

a controller[and processor,] and circuitry coupling each [such] of said emitters to said controller [and processor] for individually operating selected [such] ones of said emitters to spectrophotometrically irradiate at least two particular regions within [a] the test subject[from at least one selected test location];

a plurality of detectors, each adapted to separately receive light energy resulting from the spectrophotometric irradiation of said at least two particular regions, and to produce at least one separate set of [corresponding] signals for each [such] one of said at least two particular regions; and circuitry acting to convey said at least one separate set[s] of signals to said controller [and processor] for analytic processing;

said controller [and processor] adapted to analytically process said [conveyed] at least one separate set[s] of signals to determine separate sets of quantified data representative of a [said] metabolic condition in said at least two particular regions; and

a visual display coupled to said controller[and processor] and adapted to display separate representations of said separate sets of quantified [metabolic] data for each of said at least two particular regions in a mutually-comparative manner and on a substantially

concurrent basis, wherein at least two of said at least two particular regions are located in mutually separate regions of a brain of said test subject.

49. (Twice Amended) The apparatus of claim 48, wherein said controller[and processor] includes a computer programmed to analyze said [detector] signals to separately determine [the] a blood oxygenation state within each of said at least two particular regions.

50. (Amended) The apparatus of claim 49, wherein said computer comprises a processor, data buffers, and a timing signal generator, said data buffers adapted to store data representative of said blood oxygenation state and said timing signal generator adapted to control actuation of said emitters and detectors[accordingly].

51. (Amended) The apparatus of claim 49, wherein said controller [and processor] comprises a unitary device which includes said computer and said display.

52. (Amended) The apparatus of claim 51, wherein said unitary [controller and processor] device further includes a keyboard interface to said computer.

53. (Amended) The apparatus of claim 51, wherein said unitary [controller and processor] device further includes a data output interface.

54. (Amended) The apparatus of claim 53, wherein said unitary [controller and processor] device further includes an integral keyboard interface to said computer.

56. (Amended) The apparatus of claim 55, wherein said unitary [controller and processor unit] device further includes an integral keyboard interface to said computer.

57. (Amended) The apparatus of claim 48, wherein at least certain of said detectors and certain of said emitters comprise operational pairs, and said controller [and processor] is

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arranged to operate the emitters and detectors of at least certain of [such] said operational pairs in predetermined timed relationship while maintaining the emitters and detectors of other [such] of said operational pairs in a non-operating condition.

58. (Amended) The apparatus of claim 57, wherein said controller [and processor] is adapted to sequence the operation of said at least certain of [such emitter-detector] said operational pairs.

59. (Twice Amended) The apparatus of claim 57, wherein at least certain of said operational [emitter and detector] pairs [include at least two detectors] includes a first detector and a second detector, and wherein [at least one] the first detector [of such a pair] is located nearer the emitter [of such pair] than [at least one of the other detectors] the second detector to thereby provide near and far detector groupings for [that] said at least one of said operational pairs [of emitter and detectors].

60. (Amended) The apparatus of claim 58, wherein at least certain of said operational pairs include a plurality of said detectors arranged at mutually spaced locations which are spaced at differing distances from the emitter of [their] said at least one of said operational pairs.

61. (Amended) The apparatus of claim 59, wherein said controller [and processor] is adapted to sequence the operation of said at least one [certain] of [such emitter-detector] said operational pairs.

62. (Amended) The apparatus of claim 60, wherein said controller [and processor] is adapted to operate the emitter and a selected number less than all of the detectors of at least one of said [at least certain of said] operational pairs substantially in unison while holding the other detectors of said at least one of said operational pairs in a non-operating condition, and said controller [and processor] is further arranged to operate [such] said other detectors

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substantially in unison with said emitter at another time during which said selected number of said detectors are maintained in a non-operating condition.

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